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Research Paper

Derived Stature of Meitei community by Measuring Tibia

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ABSTRACT

North Eastern (NE) region of India is inhabited by migrant people from surrounding countries. Basu's (2003) study of Tibetan people, reported lower limb length is shorter in hilly areas than in plain valley areas. In Manipur also two types of heterogenous people are seen. One of them has a shorter lower limb length while others have long lower limbs.

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1. INTRODUCTION

As observed in the NE region of India, Manipur is a unique state where Hindu people live in comparison to neighboring states where mostly Christians or Buddhists live. Connection to Hinduism dates back to the Mahabharat age when Arjun married the princess of Manipur. Another important point is when the British made a rigorous measure to convert all tribals to Christianity, Manipur resisted and remained Hindu. It indicates their enlightenment is much more primitive than Christianity. They may have possibly migrated from North India. But the general population is looking Mongoloid and seemed to be migrated from China, erstwhile Burma, or Asian countries. In the light of research on Tibetan people unique data emerged that hilly people's leg- length is shorter than people of plain land. In this article, the data is examined by taking tibial length with the length of stature and trying to find two heterogeneous people of Manipur.

2. METHODOLOGY

This study was conducted to analyze the correlation between tibial length and stature among the Meitei community in Manipur, India. A cross-sectional design was employed, focusing on a population sample of 140 males and 110 females from various regions of Manipur. Participants were grouped into stature classes based on their height, with categories ranging from short to tall, as detailed in the results section. The primary anthropometric measurements collected were tibial length and overall stature. Stature was measured using a stadiometer with participants standing barefoot,

ensuring the Frankfurt horizontal plane was parallel to the floor. The tibial length was recorded bilaterally using an osteometric board. Participants were seated with knees flexed at 90 degrees, and measurements were taken from the medial condyle to the distal end of the medial malleolus. Both stature and tibial length were recorded to the nearest millimeter.

The collected data were analyzed statistically. Descriptive statistics, including means and standard errors, were calculated for tibial length and stature. Paired t-tests were used to compare the right and left tibial lengths, with results indicating no significant difference between them for either sex ($t = 0.36$, $p > 0.05$), as shown in Table 1.

Males were found to have longer tibial lengths compared to females, consistent with general anthropometric patterns. Tibial-stature indices were then computed by dividing tibial length by stature and expressed as percentages. These indices were analyzed across the stature classes presented in Table 2.

The analysis revealed significant variations in tibial-stature indices across different stature groups. Shorter stature classes (III and IV) displayed lower tibial-stature indices, potentially reflecting genetic and environmental influences associated with the aboriginal Mongoloid populations of the region. In contrast, taller stature classes (V, VI, and VII) exhibited higher indices, suggesting traits more aligned with North Indian ancestry.

3. RESULTS/OBSERVATIONS

Table 1: Mean, standard error of means and t-values of right and left tibial lengths for both males and females of Manipur

	Right	Left		
Population	**Mean+/- SE**	**Mean+/- SE**	**T value**	**P value**
Male	38.31+/-.200	38.21 +/-0.194	0.36	>0.05
Female	36.38 +/- 0.202	36.28 +/-0.190	0.36	>0.05

A bilateral comparison of the mean values of left and right tibial length in both sexes was assessed and it was found that right tibial length and left tibial lengths are close to each other and statistically no difference was noted. The tibial lengths in females are comparatively less than in males. This difference may be due to the short stature of females.

Table 2: Mean values of Tibial/stature index in various stature classes

Group/class	Name of class	Male range	MALES frequency	Male mean	Female range	FEMALES frequency	Female mean
I	Pygmies	-	-	-	-	-	-
II	Very short	-	-	-	-	-	-
III	Short	150-159.9	21	21.36	140-148.9	8	20.48
IV	Lower medium	160-163.9	32	21.57	149-152.9	18	21.84
V	Medium	164-166.9	33	23.15	153-155.9	17	22.79
VI	Upper medium	167-169.9	23	23.26	156-158.9	32	23.52
VII	Tall	170-179.9	31	23.67	159-167.9	35	23.59
VIII	Very tall	180-199	--		168-186.9	--	--
IX	Giants	--	--	--	--	--	--
Total			140			110	

4. DISCUSSION

The study's findings align with previous research on human adaptation to diverse environments. Ruff (1994) demonstrated that limb proportions, including shorter lower limbs relative to stature, are commonly observed in populations residing in colder climates as an adaptation to conserve heat. This aligns with the shorter tibial-stature indices observed in stature classes III and IV (as shown in Table 2), which suggest traits consistent with highland populations adapted to the cooler, hilly terrains of Northeast India. In contrast, taller stature classes (V, VI, and VII) displayed higher tibial-stature indices, indicating relatively longer tibias. This observation supports Allen's Rule, which posits that populations in warmer climates tend to have elongated limbs to enhance heat dissipation (Allen, 1877). These taller groups may represent the genetic influence of populations from the Indo-Gangetic plains, reflecting the historical admixture of Mongoloid and Indo-Aryan genetic traits in Northeast India. Indian anthropological studies, such as those by Basu *et al*. (2003), also highlight the genetic diversity and admixture in this region, supporting the heterogeneity observed in the current study.

The implications of these findings extend to the understanding of human evolution and environmental adaptation. Trinkaus (1981) suggested that morphological traits, including limb proportions, are shaped by both genetic heritage and environmental pressures, further illustrating the adaptive significance of tibial length variations. The observed differences in tibial-stature indices across stature classes underscore the influence of both long-term evolutionary adaptations and more recent cultural and environmental factors, such as dietary patterns and mobility practices.

While this study focused on tibial length, the findings resonate with anthropological observations of body proportions among high-altitude populations globally. For example, Baker and Little (1976) reported shorter limb lengths in Andean populations, reinforcing the broader applicability of these findings beyond the Meitei community.

In the context of Northeast India, the cultural aspects of highland matriarchal societies may also play a role in shaping physical traits. Women in these societies often engage in physically demanding activities, such as farming and foraging, which may influence the preservation of traditional morphological characteristics. However, the increasing use of modern transport and lifestyle changes could potentially alter these evolutionary trajectories, as hypothesized by Steegmann (2007) in his studies on environmental adaptation.

In conclusion, this study highlights the complex interplay of genetic heritage, environmental adaptation, and cultural practices in shaping the anthropometric traits of the Meitei population. Further research, incorporating additional measurements and genetic data, would help elucidate the evolutionary dynamics at play.

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